

Appl. No. : **10/615,333**
Filed : **July 8, 2003**

REMARKS

The foregoing amendments are responsive to the January 26, 2005 Office Action. Applicants respectfully request reconsideration of the present application in view of the foregoing amendments and the following remarks.

Please charge any additional fees, including any fees for additional extension of time, or credit overpayment to Deposit Account No. 11-1410.

Response to Rejection of Claims 14-17 for Informalities

The Examiner rejected Claims 14-17 as system claims being dependent on Claim 11, which is a method claim. The Examiner correctly concluded that Claims 14-17 should depend from Claim 13. Applicants have amended Claims 14-17 to depend from Claim 13.

Applicants assert that Claims 14-17 are in condition for allowance, and Applicants request allowance of Claims 14-17.

Response to Rejection of Claim 2 Under 35 U.S.C. 112, Second Paragraph

The Examiner rejected Claim 2 under 35 U.S.C. 112, second paragraph as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. Applicants have amended Claim 2 to recite an apparatus in order to be consistent with Claim 1 from which Claim 2 depends. Although not required by the Examiner, Applicants have also amended Claim 19 to depend from Claim 18.

Applicants assert that Claims 2 and 19 are in condition for allowance, and Applicants request allowance of Claims 2 and 19.

Response to Rejection of Claims 1-3 Under 35 U.S.C. 102(b)

The Examiner rejected Claims 1-3 under U.S.C. 102(b) as being anticipated by U.S. Patent 5,919,134 to Diab.

Amended Claim 1 recites an apparatus for measuring one or more blood constituents in a subject, the apparatus having a first signal source which applies a first input signal during a first time interval, a second signal source which applies a second input signal during a second time interval, a detector which detects a first parametric signal responsive to the first input signal

passing through a portion of the subject having blood therein and which detects a second parametric signal responsive to the second input signal passing through the portion of the subject, the detector generating a detector output signal responsive to the first and second parametric signals, and a signal processor which receives the detector output signal, the signal processor demodulating the detector output signal by applying a first demodulation signal to a signal responsive to the detector output signal to generate a first demodulator output signal and applying a second demodulation signal to the signal responsive to the detector output signal to generate a second demodulator output signal, the first demodulation signal having at least one component comprising a frequency, a first amplitude, and a first phase, and the second demodulation signal having at least one component comprising the frequency, a second phase, and a second amplitude, at least one of the first phase, the second phase, the first amplitude, and the second amplitude chosen using, in part, data obtained from the detector during calibration to reduce crosstalk from the first parametric signal to the second demodulator output signal and to reduce crosstalk from the second parametric signal to the first demodulator output signal.

Applicants have amended Claim 2 to recite, in combination with Claim 1, that the signal processor is configured to determine at least a portion of one of said first phase, said second phase, said first amplitude, and said second amplitude by turning off one of said first and second signal sources and measuring the crosstalk between one of the parametric signals and the non-corresponding output signal.

Applicants have amended Claim 3 to recite, a method of reducing crosstalk between two signals generated by applying a first pulse and a second pulse to measure a parameter, wherein the first pulse and the second pulse are applied periodically at a first repetition rate defining a period, and wherein the first pulse is generated during a first interval in each period and the second pulse is generated during a second interval in each period, the first and second pulses producing first and second parametric signals responsive to the parameter, the first and second parametric signals being received by a detector which outputs a composite signal responsive to the first and second parametric signals by applying a first demodulation signal to the composite signal to generate a first demodulated output signal, the first demodulation signal comprising at least one component having at least a first amplitude and a first phase, applying a second demodulation signal to the composite signal to generate a second demodulated output signal, the second demodulation signal comprising

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at least one component having at least a second amplitude and a second phase, lowpass filtering the first demodulated output signal to generate a first recovered output signal responsive to the first parametric signal, lowpass filtering the second demodulated output signal to generate a second recovered output signal responsive to the second parametric signal, and choosing at least one of the first phase, the second phase, the first amplitude, and the second amplitude to reduce crosstalk components in the first recovered output signal and the second recovered output signal based at least in part on data obtained from the detector during a calibration procedure.

Applicants assert that Claims 1-3 are in condition for allowance, and Applicants request allowance of Claims 1-3.

Response to Rejection of Claims 10-12 and 18-19 Under 35 U.S.C. 102(b)

The Examiner rejected Claims 10-12 and 18-19 under 35 U.S.C. 102(b) as being anticipated by U.S. Patent 5,995,858 to Kinast. Kinast teaches a fixed phase splitter driven by a clock.

With regard to Claim 10, Kinast does not teach or suggest a method of demodulating a composite signal generated by applying first and second periodic pulses of electromagnetic energy to a system having a parameter to be measured and by receiving signals responsive to the electromagnetic energy after having passed through the system and being affected by the parameter being measured, the signals received as a composite signal having first and second components responsive to the first and second pulses respectively, by applying a first demodulation signal to the composite signal to generate a first demodulated signal, the first demodulated signal having a primary component corresponding to the first component and a residual component corresponding to the second component, lowpass filtering the first demodulated signal to generate a first output signal, and adjusting, at least one of a first amplitude, a second amplitude, a first phase, and a second phase of the demodulation signal to reduce the residual component with respect to the primary component.

With regard to Claim 11, Kinast does not teach or suggest applying a second demodulation signal to the composite signal to generate a second demodulated signal, the second demodulation signal having first and second components, and lowpass filtering the second

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demodulated signal to generate a second output signal, the second output signal varying in response to an effect of the parameter on the electromagnetic energy received from the second pulse.

With regard to Claim 12, Kinast does not teach or suggest adjusting to reduce crosstalk.

With regard to Claim 18, Kinast does not teach or suggest an apparatus for demodulating a composite signal having means for applying a first demodulation signal to said composite signal to generate a first demodulated signal comprising a primary component corresponding to a first component of said composite signal and a residual component corresponding to a second component of said composite signal, and means for adjusting a phase of said demodulation signal to reduce said residual component with respect to said primary component.

With regard to Claim 19, Kinast does not teach or suggest the apparatus of Claim 18 further including means for applying a second demodulation signal to said composite signal to generate a second demodulated signal comprising a primary component corresponding to said second component of said composite signal and a residual component corresponding to said first component of said composite signal, and means for adjusting a phase of said second demodulation signal to reduce said residual component with respect to said primary component.

Applicants assert that Claims 10-12 and 18-19 are in condition for allowance, and Applicants request allowance of Claims 10-12 and 18-19.

Response to Objection of Claims 4-9

The Examiner objected to Claims 4-9 as being dependent on a rejected base claim. The Examiner has indicated that Claims 4-9 would be allowable if rewritten in independent form including all the limitations of the base claim and any intervening claims.

Applicants assert that Claims 4-9 are patentable over the prior art, and Applicants request allowance of Claims 4-9.

Summary

Applicants respectfully assert that Claims 1-19 are in condition for allowance, and Applicants request allowance of Claims 1-19. If there are any remaining issues that can be


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resolved by a telephone conference, the Examiner is invited to call the undersigned attorney at (949) 721-6305 or at the number listed below.

Respectfully submitted,

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